



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005GU56B

Title: Developing Digital Watershed Atlas for Guam

Project Type: Research

Focus Categories: Models, Management and Planning, Surface Water

Keywords: watershed management, drainage, water resources development, resource planning

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Abstract

Effective management of island water resources requires accurate information of the physical and environmental components of all the watersheds. There are sixteen (16) watersheds in southern Guam that contribute the runoff to the streams and coastal areas. Protecting these watersheds from point and non-point sources of pollution needs a better understanding of the watershed topography, vegetation, soil properties, roads, land use and land cover information, badland and many other features. The watershed's features should be stored and formatted in such a way that it could be easily available for any water resources study such as; watershed planning and management, estimating upland erosion, impacts of mans activities on the quality and quantity of the streams and lake. In addition, the information should be stored in such a way that it could be easily updated and will be available to all interested agencies and researchers. During 1990s, geographical information system (GIS), with its ability to pull spatial data from different

sources into an integrated environment, emerged as a significant tool for hydrologic modeling. Particularly, GIS provided a consistent method for watershed delineation using digital elevation models (DEMs). In this project, GIS and related technologies such as remote sensing and global positioning system (GPS) will be used to collect, digitize, organize, model and analyze data on watershed characteristics. A geo-database will be established to incorporate physical, environmental and socio-economic information in the watersheds. Remote sensing will be a tool for data updates for the digital watershed atlas. GPS will provide data updating for the GIS database, and be used for some data ground-truthing. GIS, enhanced by remote sensing and GPS capabilities, is a core tool for establishing a digital watershed atlas for Guam. The overall objective of this project is to create an atlas of Southern Guam's watershed that includes the watershed boundary with its physical and environmental components. The specific goals are:

1. Form a core user group for atlas development. At the startup of the project, the researchers will put together a committee with representatives from Government of Guam related agencies. The role of this committee is to identify the digital elevation model (DEM) that should be used and what information should be included into the atlas.
2. Develop physical characteristics of watershed layers. During this phase the layers that describe the physical characteristics of the southern Guam watersheds will be put together. This will include; a) acquire or develop standard Digital Elevation Model (DEM) set for the island, b) develop watershed boundaries for all major basins in South Guam, c) develop sub watershed boundaries according to the consensus of the core group, d) develop stream maps for all the major streams, e) develop layers showing river mile locations for all major streams, f) develop stream profiles (graphs of elevation vs. river mile) for all major rivers, and g) develop slope and slope aspect maps for all of South Guam.
3. Develop or acquire existing layers identified as being important by the consensus of the core group. All layers will be projected into one common projection system. Some examples of possible layers might be: soil type, vegetation coverage, fault lines, badlands, and roads.